

# “Scratch Building Structures”

*By Brad Morneau*

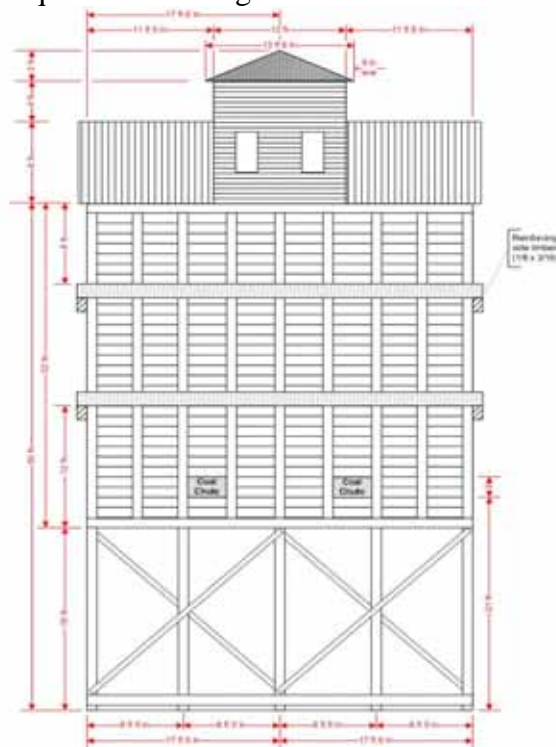
This clinic covers my approach to scratch-building structures. Why scratch-build? Especially when there are many great kits and complete structures produced today?

To begin with, if you are like me there is a great deal of satisfaction completing a structure and displaying it on your railroad. You can build very unique structures that can only be found on your railroad. It's always interesting to see folks visit your railroad and comment on all of the commercial structures they recognize. It therefore gives your railroad an unique look and feel. If you're working towards your AP certificate in structures then this becomes very important. The AP requires you to have 6 kit-built and 6 scratch-built structures, 6 of which must earn 87.5 merit points or better. It's been my experience the surest way to get those points is to build a structure from scratch.

Additionally, any modeler who is into proto-type railroads may find it difficult or impossible to find a particular structure that exists or did exist on his or her railroad. In this case, if you can find drawings or at least a picture or two you can complete your own drawings and build the structure.

In the last few years I have been spending more time designing my structures and have found that the fabrication and assembly process is getting easier. There's nothing like getting into a project with materials cut and find out an idea you had in your mind doesn't exactly work out in practice. This wastes time and material and worse yet may cause you to lose interest in the project altogether.

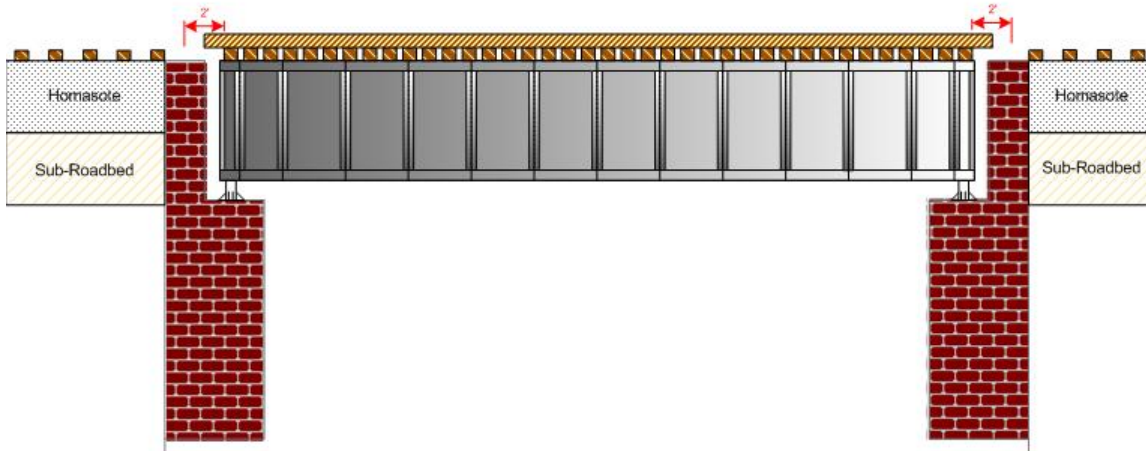
My method of planning relies on a couple of programs on my computer. One is Visio, which isn't exactly designed for this use, but works well for me. I also use the humble Microsoft Paint to design certain objects. Yes, if you can learn a few tricks it can allow you to create some interesting things. My goal here isn't to teach you anything about these programs, rather to get you to spend time designing and planning and to convince you that you can build anything you want. If you prefer, you can draw anything via the tried and true method of pencil on paper. I still own a drafting board and T-square I'll never get rid of.



Being a “free-lance” modeler gives me the freedom in one sense of using any type of structure I want, however I also want it to be within reason and as similar to prototype railroads as is possible. I’ve used several generalized books and magazines that explain how railroads built various structures like bridges, stations and other support structures. I like to follow proto-typical methods similar to how any railroad would’ve to create believable structures. These books give me the direction I need to design believable structures.

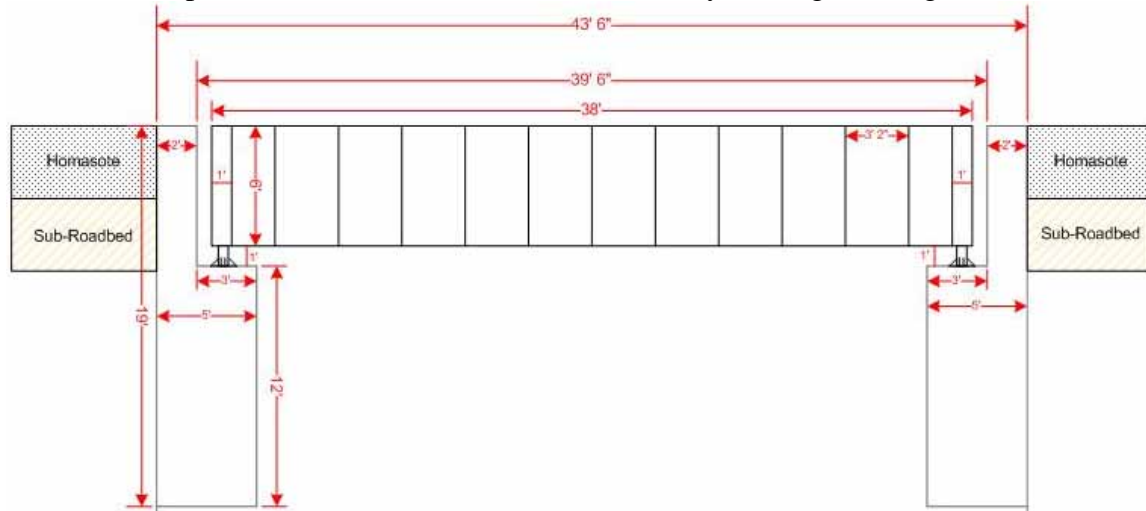
Once I’ve decided on a particular structure, I then start with a background in my scale; HO. (Any scale would be treated the same way)

I like to draw out all sides of a structure first, in some cases similar to an elevation drawing. For this discussion I’ll use my simple girder bridge project.

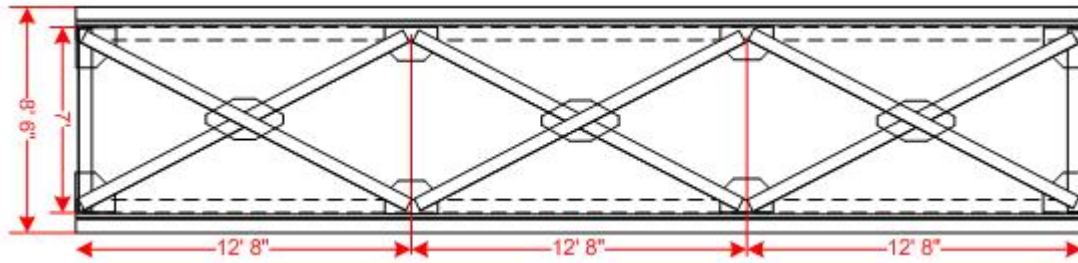


This shows my elevation drawing for the I.R.&C.L. R.R. Bridge No. 1. It shows the girder bridge with the deck and the abutments as well.

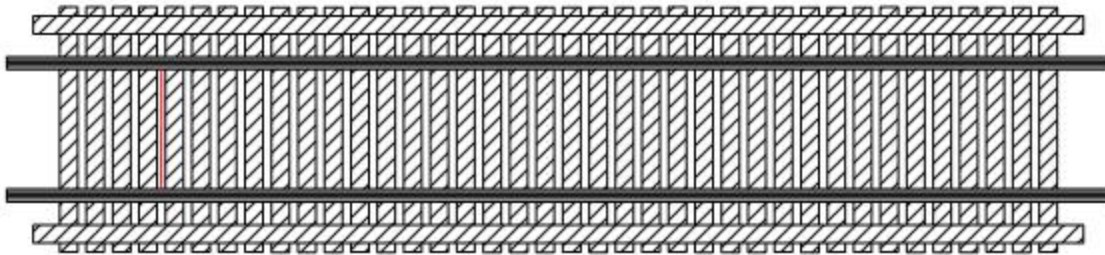
I follow this up with more detailed measurements in my starting drawings:



The second drawing lays out all of the basic side view measurements necessary for this structure. Then I move on to the more detailed top view drawings. The next drawing lays out the top of the bridge girder and the cross-beams that tie it together.

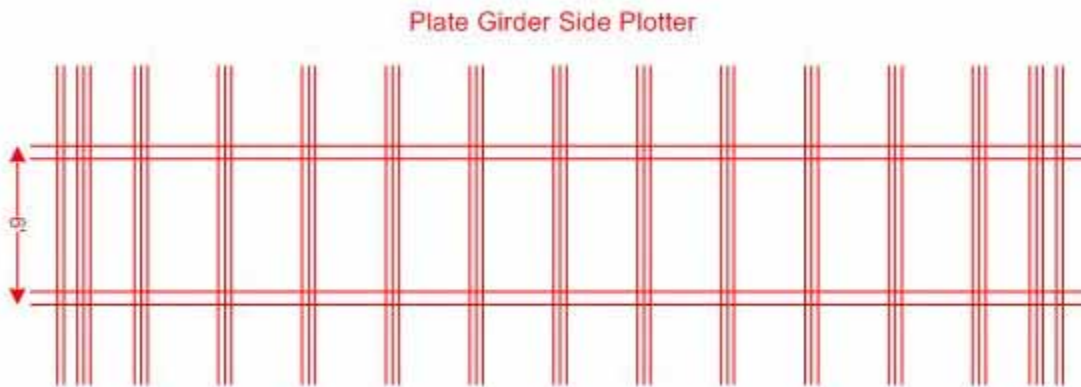


Each succeeding step allows you to go into more detail on the structure. Once I knew what the width of the plate girders would be and how far apart, I was able to design the deck.

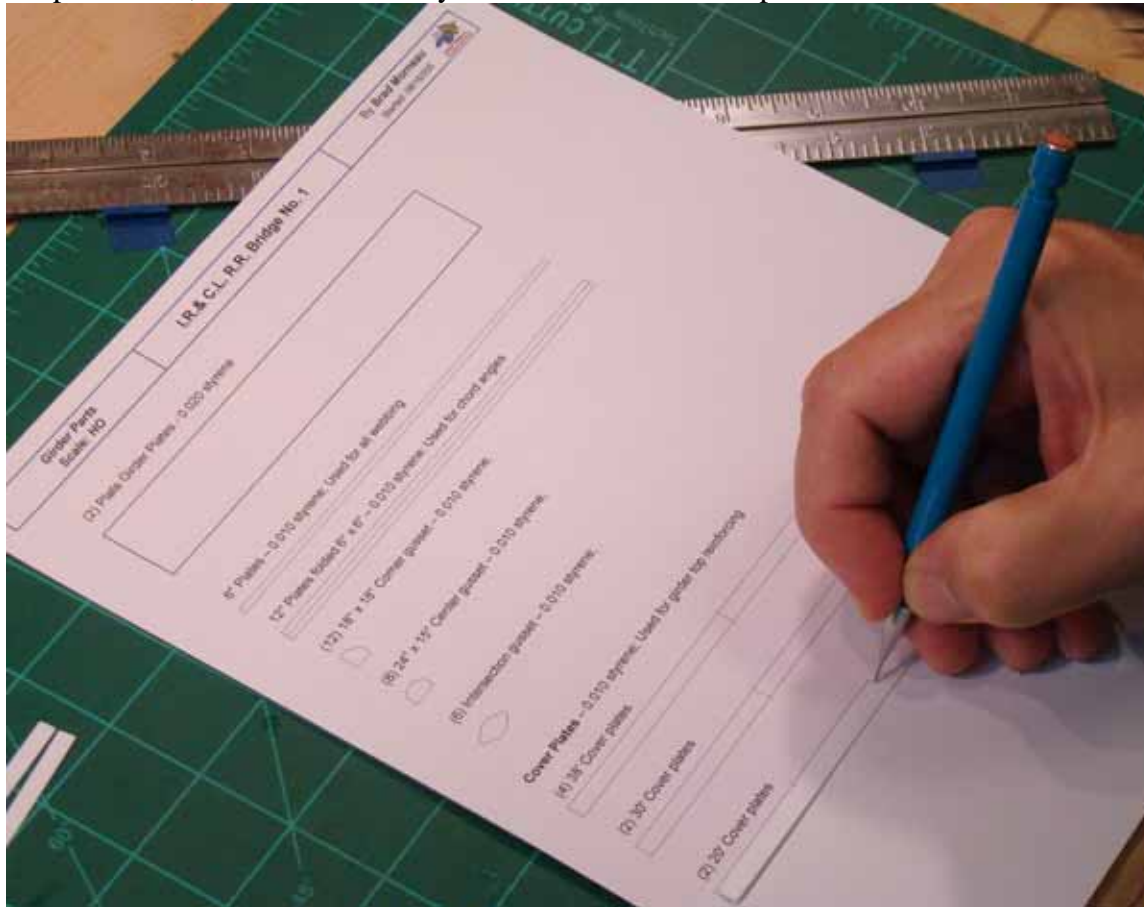


From here, I create a page of what I call “plotting” diagrams. These are drawings that I will print on light-weight cardboard and use to actually assemble the model. The plotting diagrams help me to assemble the parts much more accurately.

Another type of plotting diagram I use is one that allows me to plot lines on styrene. This helps in transferring multiple lines without having to repeat measurements and ultimately make mistakes.

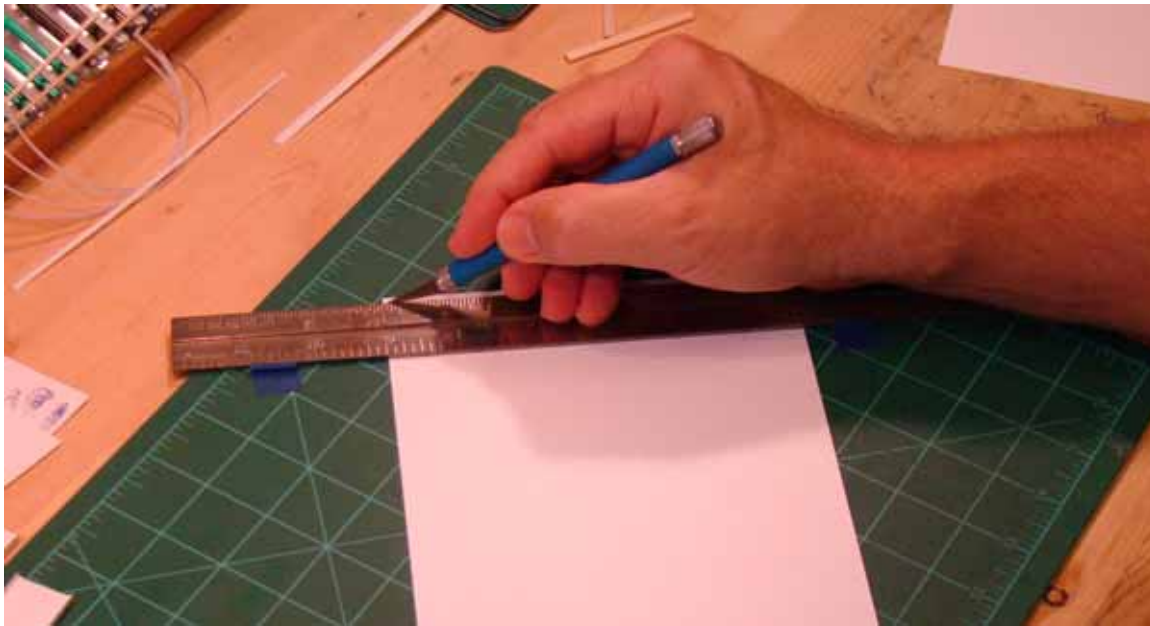


I also print parts drawings that separate individual parts from the rest of the drawing to make it easier to cut since I don't have to perform the measurements again. I just line up the material on the parts sheet, make the necessary marks and then cut the part.

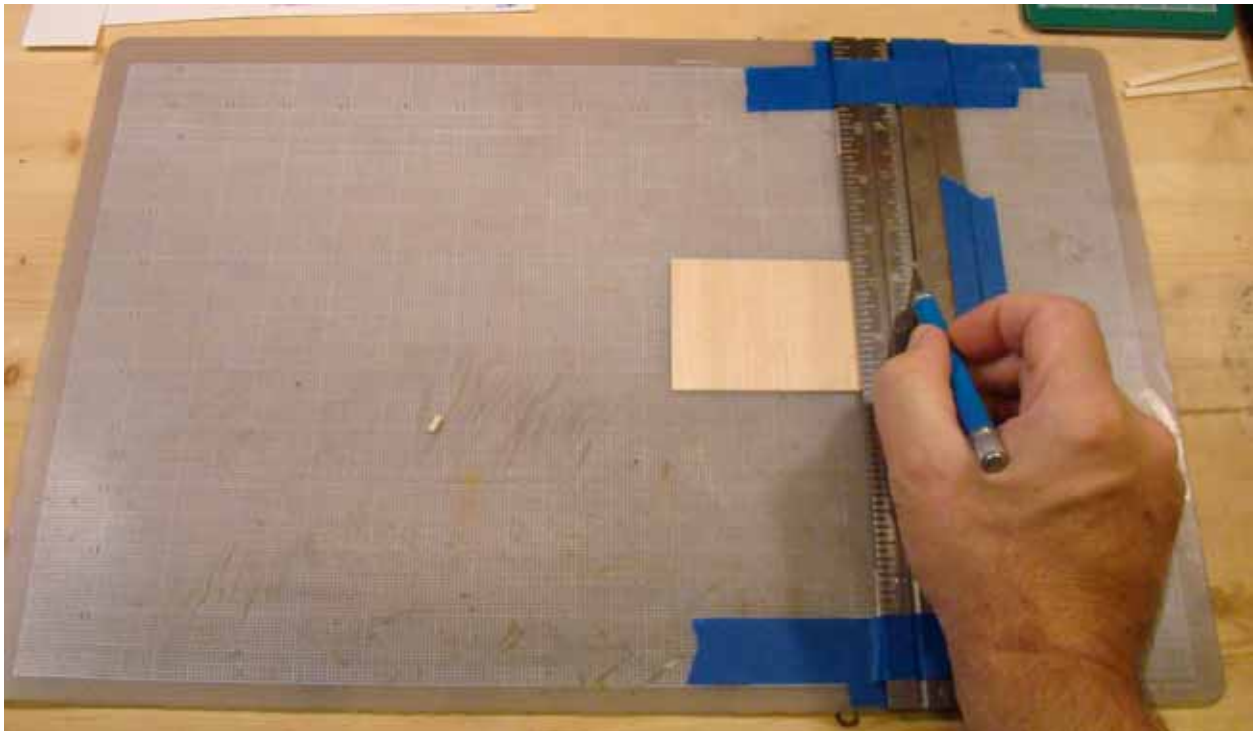


As the picture demonstrates, I just lay the styrene over the lines, make my marks and then cut the parts.

While cutting styrene parts, I've experienced difficulties getting the ruler to stay in place. To alleviate this, I simply taped two 1/8" x 1/8" blocks to my cutting mat and then rested the ruler against them. The blocks are placed far enough apart to allow the material to slide between them and under the ruler.



Another trick I use is for cutting strip wood. I usually start with sheet wood material either bass or balsa and then I line up two rulers spaced apart using scrap pieces of wood. I tape the rulers down with one of the rulers sitting on small pieces of similar material to what I'm going to cut. This allows the sheet material to slide under one of the rulers while stopping against the other.



The main lesson here is planning. I will spend an appreciable amount of time up front to plan a model as accurately as possible and to work out as many of the structures details as I can. Because of better planning, even my more complex models have come together much easier and I'm much happier with the results. It's also important if you're pursuing an AP certificate to have good plans to go along with the model. Judges appreciate models that have been planned and constructed accurately and faithfully to their original designs.